Melsheimer, F. E. 1846. Descriptions of new species of Coleoptera of the United States. Proc. Acad. Nat. Sci. Phil. 2:302–318.
Pic, M. 1912. Anobiidae. Pars 48. *In* Coleopterorum Catalogus, W. Junk, Berlin. 92 pp.
Sturm, J. 1837. Duetschlands Fauna in Abbild . . . Nürnberg. vol. 12, 88 pp.

A NEW SPECIES OF DIORYCTRIA INFESTING LOBLOLLY PINE[1,2] (LEPIDOPTERA: PYRALIDAE)

B. D. SCHABER[3] and F. E. WOOD, *Department of Entomology, University of Maryland, College Park, Maryland 20742*

ABSTRACT—A new species of Pyralidae, *Dioryctria* **taedae**, injurious to loblolly pine cones (*Pinus taeda* L.), is described. The known range of this species is Delaware, Maryland, Virginia, North Carolina, South Carolina and Georgia.

One of the phycitine moths destructive to the cones of loblolly pine (*Pinus taeda* L.) in Maryland, North Carolina, and Georgia is determined in the literature as *Dioryctria zimmermani* (Grote) (Neunzig, Cashatt and Matuza, 1964, 1964b; Coulson and Franklin, 1964; CEIR, 1964). Specimens of *Dioryctria* infesting loblolly pine cones in those states however, cannot be assigned to *D. zimmermani*. Evidence from morphological and biological studies show that those specimens represent a new species which is described below, along with a key to the species of *Dioryctria* infesting pine trees in the Atlantic coastal states.

Dioryctria taedae, n. sp.

Holotype, male: length 14 mm, length of fore wing 12 mm; head grey; palpi darker, upturned beyond vertex; antennae light brown, first 8 segments each with a dorsal black, thorn-like spine, more or less concealed by rough scales; collar fuscous; ruff grey; thorax grey above, with silver luster, flecked with darker scales; abdominal segments grey anteriorly, a band of creamy white scales posteriorly with black spots on first 2 abdominal segments; white scales predominant on venter of abdominal segments 1 through 7 and grey on segments 8, 9, and 10; femora speckled with dark and white scales; middle and hind tibiae dark with 3 ivory bands; fore tibiae without spurs; mid tibiae with 2 apical spurs; hind tibiae with 2 medial and 2 apical spurs; tarsal segments grey basally, ringed with white scales apically.

[1] Scientific Article No. A1670, contribution No. 4420 of the Maryland Agricultural Experiment Station, Department of Entomology.
[2] Immediate publication secured by full payment of page charges.—Editor.
[3] Present address: B. D. Schaber, Department of Entomology, South Dakota State University, Brooking, South Dakota 57006.

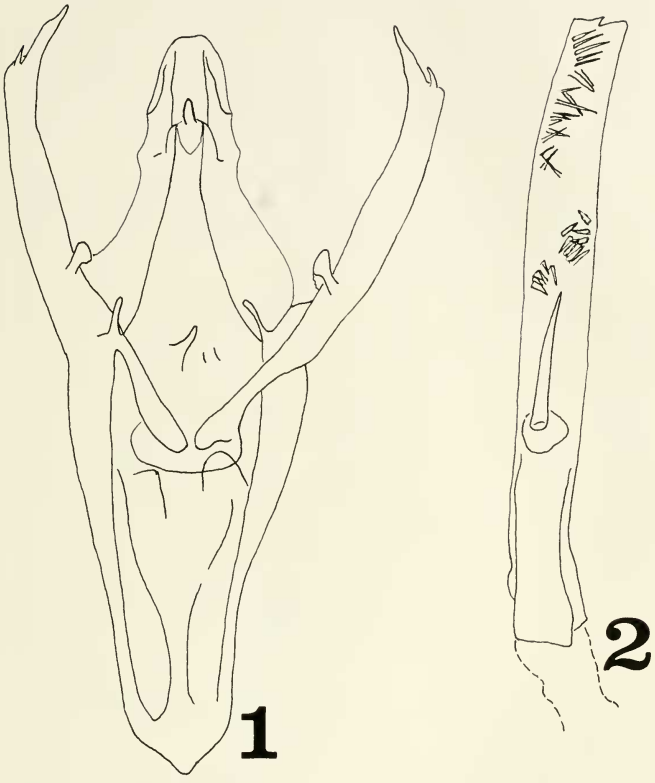
Fore wing above with a ridge of raised scales preceding the antemedial line (subbasal) and 1 following the antemedial line, and some raised scaling of the discal spot and outer median area including the subterminal line; ground color very dark brown; scales of the transverse lines, discal spot, blotch following the antemedial line, blotch near inner margin of subterminal line on posterior half of wing, and a pale area just within terminal margin grey; basal, medial, and terminal areas shaded with dark rust colored scales, more apparent between subbasal scale ridge and antemedial line, and between antemedial and subterminal ridge; subbasal ridge black, antemedial ridge greyish, flecked with reddish scales; subterminal ridge greyish; black scaling limited to thin borders of transverse lines, spot at extreme base of forewing, and terminal line; transverse lines prominent, antemedial transverse line bidentate, subterminal transverse line dentate before middle; fringe grey, scales tipped with white. Fore wing below, anterior ⅓ lighter, rest of wing darker, anterior margin almost white nearly to apex. Hind wing above, smoky-grey with a fumose border along terminal margin, fading towards base, and with a narrow dark line along termens. Hind wing below, dark along anterior margin and along most of terminal margin; fringe silvery-grey with an even dark grey band near scale bases.

Male genitalia with uncus slightly longer than broad (fig. 1), lateral margins recurved toward center; terminal margin rounded; valves with costa broadly sclerotized, terminating in a long curved pointed hook, with a short spine issuing from its lower outer margin; process on inner face of valve digitate; arms of annellus long, curved and flat with several small spines at apex, and 2 spines down the inner margin; transtilla present; cucullus narrow, pointed at apex and ending just beyond the point of spine; aedeagus (fig. 2) with posterior linear spine cluster and 2 other small spine clusters just preceding a long, narrow, straight, pointed anterior spine, spine terminating at 1st small cluster of spines.

Allotype, female: same as male but with more reddish ground color on dorsal fore wing; hind wing dorsally with much darker and broader border along terminal margin; both wings darker below.

The female genitalia (fig. 3). Ductus bursae ribbon-like and sclerotized for its entire length except for a small area preceding the genital opening; constricted behind middle, longitudinally ribbed, narrowing, and terminating in a produced, weakly trilobed, almost rounded central projection; broadening anteriorly and bent toward bursa; bursa with the spine cluster closely grouped.

Types: *Holotype*: National Museum of Natural History Type No. 71372. Male, Maryland, St. Marys Co., 2 mi E. of Scotland, 0.3 mi S. off Mur-Ray Rd., IX-19-69, B. D. Schaber, cone of *P. taeda*, Em. XI-05-69; male genitalia on slide S9-1969-7 B.D.S. 1969. *Allotype*: female, Maryland, St. Marys Co., 2 mi E. of Scotland, 0.3 mi S. off of Mur-Ray Rd., IX-18-1969, B. D. Schaber, cone of *P. taeda*, emerged XI-11-69; female genitalia on slide S9-1969-6 B.D.S. 1969. *Paratypes*: female and male, Delaware, Sussex Co., 7 mi E. of Bridgeville, 0.8 mi E. of Cokesbury Church, VIII-27-1969, B. D. Schaber, cones of *P. taeda*, Em. VIII-28-69, Em. IX-1-68; female, Maryland; Somerset Co., Marion, VII-1-1968, B. D. Schaber, cone of *P. taeda*, Em. VIII-9-68; male, Somerset Co., 0.75 mi S. of Emanuel Church, VI-25-1967, B. D. Schaber, Em.



Figs. 1–2. *Dioryctria taedae*, n. sp., male genitalia: 1, uncus with lateral margins; 2, aedeagus.

VIII-12-68, male genitalia on slide S2-2069-7, B.D.S. 1969; female, St. Marys Co., 2 mi E. of Scotland, 0.3 mi S. off of Mur-Ray Rd., IX-19-1969, B. D. Schaber, cone of *P. taeda*, Em. X-19-69, B. D. Schaber; female, Wicomico Co., 1.5 mi N. of Whitehaven, VII-18-1968, B. D. Schaber, terminal of *P. taeda*, Em. VIII-21-68. The above holotype, allotype and paratypes are in the U. S. National Museum, Washington, D.C.

Paratypes in the Canadian National Collection, Ottawa, Canada: male, Maryland: Somerset Co., 1 mi S. Kingston, behind Moores

Chapel, IX-24-1969, B. D. Schaber, cone of *P. taeda*, Em. X-28-69; 2 females, 1 male, Wicomico Co., 1.5 mi N. of Whitehaven, VII-11-1968, B. D. Schaber, cones of *P. taeda*, Em. Aug. 26, 27, 29, 1968; female, Worcester Co., reared-cones-lab., Aug. 23, 1966, F. E. Wood, female genitalia on slide S1-368-7, B.D.S. 1968; male, Worcester Co., Snow Hill, 4 mi N. ½ mi E. VII-31-1969, B. D. Schaber, cones of *P. taeda*, Em. VII-18-69.

Paratypes in British Museum (N. H.), London, England: male, Delaware, Sussex Co., 7 mi E. Bridgeville, 0.18 mi E. Cokesbury Church, VIII-28-1969, B. D. Schaber, cone of *P. taeda*, Em. X-6-69. Female, same locality, Em. X-7-69, cone of *P. taeda*.

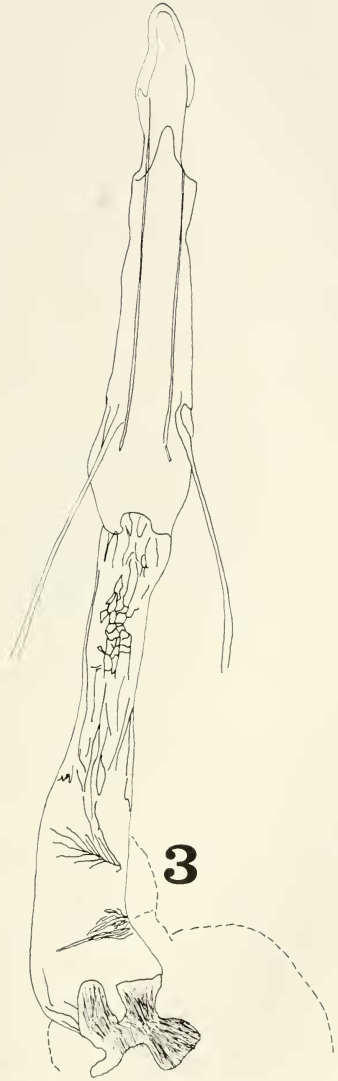
Additional Material Examined: Delaware: Sussex Co., Bridgeville, August 26, 28, 1969, from cones of *P. taeda*. Maryland: Somerset Co., Allen, August 7, 1968 from cones of *P. taeda*; Champ, July 10 and 13, 1967 from cones of *P. taeda*; Emanuel Church, June 28, 1968 from cones of *P. taeda*; Marion, July 1, 1968 from cones of *P. taeda*; 1 mi S. Kingston, behind Moores Chapel, September 24, 1969, from cones of *P. taeda*; Princess Anne, June 30, July 1967, from cones of *P. taeda*; Rehobeth, August 1, 1967, from cones of *P. taeda*; St. Marys Co., Scotland, September 18 and 19, 1969, from cones of *P. taeda*; Wicomico Co.: Quantico, September 24, 1964; Salisbury, August 27, 1964; Whitehaven, July 11 and 18, 1968, from cones and from terminals of *P. taeda*; Willards, August 27, 1964; Worcester Co., Snow Hill, November 4, 1965, February 11, 1966, July 23, 1966, July 28, 1966, September 15, 1966, November 5, 1966, November 10, 1966. Virginia: King and Queen Co., August 14, 1941, from cones of *P. taeda*; Princess Anne Co., Cape Henry, June 9, 1927. North Carolina: Lenoir Co., Kinston, June 8 and 9, 1960, from cones of *P. taeda*; Onslow Co., Richland, August 17, 1960, from cones of *P. taeda* and *P. echinata* Mill. Specimens deposited in U. S. National Museum, Washington, D.C. Georgia: Bibb Co., Coll. 2-IV-68, Macon, Ga., R. N. Coulson, Em. 29-V-68, Ex. fusiform canker (Lob.); Clark Co., Coll. 1-IV-68, Athens, Ga., R. N. Coulson, Em. 7-V-68, Ex. fusiform canker (Lob.); Green Co., Coll. 20-IV-66, Green Co., Ga., R. N. Coulson, Ex. Shortleaf, Sec. Yr. Cone, Em. 27-VII-66; Coll. 6-6-67, Green Co., Ga., R. N. Coulson, from Lob. Sec. Yr. Cone, Em. 9-10-67. Specimens in University of Georgia Collection.

KEY TO THE SPECIES OF **Dioryctria** INFESTING PINE TREES IN THE ATLANTIC COASTAL STATES

1a. Fore wings yellow and orange ..... **D. disclusa** Heinrich
1b. Fore wings grey, sometimes mottled with brown 2

→

Fig. 3. *Dioryctria taedae*, n. sp., female genitalia.


3

2a. Fore wings with two crossbands each lighter than ground color of wing ... 3
2b. Fore wings with one light crossband distally and a broad blackish band proximally ... **D. clarioralis** (Walker)
3a. Fore wings bluish grey, light or white dusting basally, all wing scales smooth ... **D. abietivorella** (Grote)
3b. Fore wings distinctly mottled with dark brown, dark not white basally, some patches of raised scales usually present ... 4
4a. Fore wings reddish brown basally, hind wings almost white ... **D. zimmermani** (Grote)
4b. Fore wings dark brown basally, hind wings tan ... 5
5a. Fore wings with crossbands very bright white ... **D. amatella** (Hulst)
5b. Fore wings with crossbands grey ... **D. taedae** Schaber and Wood

The male differs from the female in having the raised scales and spines on the 1st 8 segments of each antenna. The hind wing of the male has a distinct black border. The hind wing of the female is darker with a very wide dark border. The terminal segment of the male abdomen has tufts, while the terminal segment of the female abdomen has a ring of long fine scales.

The genitalia of other North American species of *Dioryctria*, such as, *D. zimmermani*, *D. amatella*, *D. albovittella*, *D. cambiicola*, are apparently identical or at least very similar (Heinrich, 1956). According to Mutuura et al. (1969a) the genitalia of *D. tumicolella* (Mutuura, Munroe, Ross) and *D. cambiicola* (Dyar) are the same or at least very similar. Likewise, the genitalia of *D. contortella* (Mutuura et al.), *D. monticocella* (Mutuura et al.) and *D. banksiella* (Mutuura et al.) are very similar (Mutuura et al., 1969a). These genitalic similarities then, necessitate more weight being placed on other morphological characters, geographic ranges, and biologies.

When the wing coloration of the 3 following species are compared, it is noted that specimens of *D. zimmermani* exhibit reddish scales dorsally at the base of the fore wings. The transverse lines are a dark grey as are other of the lighter maculations. The hind wings of *D. zimmermani* are nearly white, only slightly tan around the edges, and with a very narrow brown border. The fore wings of *D. taedae* dorsally exhibit a ground color of grey brown. Reddish scales fleck the fore wings of *D. taedae* but they are not concentrated at the wing base. The transverse lines and other maculations are a light grey and the hind wings are light smoky grey medially with a broad dark grey marginal border becoming lighter toward the center of the wing. In both species, *D. zimmermani* and *D. taedae*, the fore wings below are a very dark, nearly uniform grey. The hind wings below reflect the dorsal coloration. *D. amatella* is distinct from both of the above species, in that it has bright white transverse bands and discal spots on the fore wings. The hind wings are smoky grey with a dark grey border

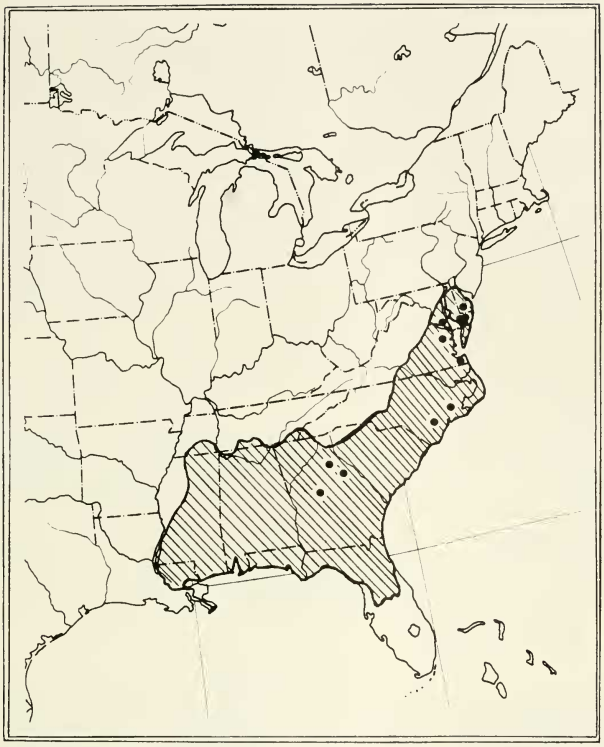


Fig. 4. Range of loblolly pine east of the Mississippi River and collection sites of *Dioryctria taedae*, n. sp.

narrower than the border of *D. taedae*. Below, the front wings of *D. amatella* are brownish.

Specimens determined as *D. zimmermani* in North Carolina and Georgia have been questioned on biological grounds by Neunzig, Cashatt and Matuza (1964), Neunzig, Rabb and Merkel (1964), Neunzig and Merkel (1967), and Coulson and Franklin (1968).

Classically tree damage by *D. zimmermani* has consisted of tunneling in the cambium of trunks and branches (Heinrich, 1956; Rennels, 1960; Schuder, 1960). Conversely in Delaware, Maryland, Virginia, North Carolina and Georgia, *Dioryctria* damage to loblolly pine

has been limited to infestations of cones and tunneling in terminals by young larvae. Only one instance of boring in bark has been recorded in Georgia. Other species of trees where *D. taedae* infested cones in very limited numbers are pond pine, *Pinus serotina* Michx. (Maryland) and shortleaf pine, *Pinus echinata* (Georgia, Franklin and Coulson, 1968).

Polivka and Houser (1936) compared tip moth infestations in pitch pine, shortleaf pine, ponderosa pine and loblolly pines in Ohio. The first two species were investigated in both native stands and in plantings; the latter two only in plantings. The species of moths observed were the Zimmerman "Tip Moth," the Nantucket Tip Moth and the Comstock Tip Moth. Interestingly, there was no infestation of introduced loblolly pine or ponderosa pine by *D. zimmermani* indicating that the larvae of that species do not infest the terminals of those two pine species planted within its range.

The range of *D. taedae* (fig. 4) is from southern Delaware, the Maryland-Virginia peninsula, southern Maryland, Virginia, North Carolina to Georgia.

Heinrich (1956) in discussing a western species, *D. cambiicola* (Dyar), with genitalia similar to *D. amatella, D. taedae* and *D. zimmermani* commented that Dyar noted in his original description, an eastern specimen (presumably from Washington, D.C.) reared from a cone of *Pinus taeda*, Aug. 14, 1882. Heinrich further states "I have also before me a similar female from Cape Henry, reared June 9, 1927. I suspect that both these examples may be hybrids of *zimmermani* and *amatella*." The specimens to which Heinrich refers have been seen and determined as *D. taedae*.

Acknowledgments

We wish to thank W. E. Bickley, Department of Entomology, University of Maryland, W. D. Duckworth, U. S. National Museum, D. C. Ferguson, U. S. Department of Agriculture, Systematic Entomology Laboratory, and E. P. Merkel, U. S. Department of Agriculture, Southeastern Forest Experiment Station for their interest and counsel, and J. Geesaman, R. Murray and R. Whitney, Maryland Department of Forests and Parks for their interest, time and effort in helping locate and collect infested loblolly pinecones.

We would also like to express our gratitude to the following people for specimens of *Dioryctria* loaned for this study. R. N. Coulson, University of Georgia, W. D. Duckworth, U.S.N.M., F. E. Kurczewski, Syracuse University, W. J. Mattson, North Central Forest Experiment Station, St. Paul, Minn., E. P. Merkel, Southeastern Forest Experiment Station, Olustee, Florida, and L. L. Pechuman, Cornell University.

References

Cooperative Economic Insect Report, U.S.D.A. 1964. 14(51):1294.

Coulson, Robert N. *and* **Rudolph T. Franklin.** 1968. Insects affecting seed

production of shortleaf pine in the Georgia Piedmont. Can. Ent. 100(7):807–812.

Heinrich, Carl. 1956. American moths of the sub-family Phycitinae. U.S. Nat. Mus. Bull. 207:1–581.

Mutuura, Akira, Eugene Monroe *and* **D. A. Ross.** 1969a. American species of *Dioryctria* (Lepidoptera: Pyralidae) I. Western Canadian species of the *zimmermani* group. Can. Ent. 101(10):1009–1023.

————. 1969b. American species of *Dioryctria* (Lepidoptera: Pyralidae) II. Western Canadian species of the *baumhoferi* and *ponderosae* groups. Can. Ent. 101(10):1042–1047.

Neunzig, H. H., E. D. Cashatt *and* **G. A. Matuza.** 1964. Observations on the biology of four species of *Dioryctria* in North Carolina (Lepidoptera: Phycitidae). Ann. Ent. Soc. Amer. 57(3):317–321.

————, **R. L. Rabb** *and* **E. P. Merkel.** 1964. Larvae of the genus *Dioryctria* (Lepidoptera: Phycitidae) in the southeastern United States. Ann. Ent. Soc. Amer. 57(6):693–700.

———— *and* **E. P. Merkel.** 1967. Taxonomic study of the pupae of the genus *Dioryctria* in southeastern United States (Lepidoptera, Phycitidae). Ann. Ent. Soc. Amer. 60(4):801–808.

Polivka, J. B. *and* **J. S. Houser.** 1936. Pine-tip moths of southern Ohio. J. Econ. Ent. 29(3):494–497.

Rennels, R. G. 1960. The Zimmerman pine moth. Univ. Illinois Bull. 660:1–39.

Schuder, D. L. 1960. The Zimmerman pine moth. Purdue Univ. Agr. Exp. Sta. Res. Bull. 698:1–8.

TWO MITES AND THEIR INSECT HOSTS FROM SAN MATEO COUNTY, CALIFORNIA

(Acarina: Scutacaridae, Uropodidae)

During routine examination of light trap collections from San Mateo County, California, two insect specimens were found to have attached mites.

From a trap at San Carlos, California, a single male halictid, *Lasioglossum titusi* (Crawford), a ground nesting, solitary, pollen collecting bee was found which carried five mites, Scutacaridae, *Imparipes* sp., clustered ventrally at the base of the abdomen. Little information is known about this family especially this genus. Sweetman (*The Principles of Biological Control*, 1963) referred to the family Scutacaridae as being composed largely of mites predaceous or parasitic on arthropods.

A light trap collection from San Mateo, California, contained a single male staphylinid, *Philonthus longicornis* Stephens. Three immature mites, Uropodidae, were attached ventrally at the base of the abdomen. Sweetman stated that this family was often associated with arthropods.

We wish to thank Dr. E. W. Baker, Agricultural Research Service, United States Department of Agriculture, Washington, D. C., for identification of the mite specimens, Dr. Gerald I. Stage, Smithsonian Institution, United States National Museum, Washington, D. C., for determination of the male halictid, and Dr. M. V. Miller, 57 Arlena Terrace, Ramsey, N. J., for identification of the male staphylinid.

—R. H. Whitsel *and* R. F. Schoeppner, *San Mateo County Mosquito Abatement District, 1350 North Carolan Avenue, Burlingame, California 94010.*